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January 2, 1962

Re: Biopoiesis: flames

Dear Luca--

I just remembered having forgotten to bring this up in Milan. With ~~the~~ all the fancy mechanisms of photochemical activation that have been proposed for biopoiesis, I think some of the simplest mechanisms for producing free radicals (which then recombine to make higher polymers) have been overlooked: especially flames.

I would certainly ask our chemical colleagues to consider the feasibility of burning a small jet of oxygen, or oxygen-gas mixtures carrying the gas stream into the test mixture (which is of course free of oxygen). This may not be as "efficient" as the electric discharge, but could be much more convenient.

If you want to start with something even simpler, just burn a gas mixture with air, making a sooty flame, impinge this on a cold surface, and extract the soot. This may already give you more than enough to work with; ultimately, you may want to establish rather less oxidising conditions to help trap more fragile compounds. But meanwhile, even to find that some complex materials that can be identified (say phenols) or pyridines, if the gas also has ammonia) would be a strong encouragement. It doesn't seem important to establish a high efficiency of conversion of the input material; better to have a convenient concentration of the product, viz. in the soot. If there is too much oxygen, the soot may be mainly carbon, so try to maintain excess CH_4 or whatever.

To be specific, I would start with $\text{CH}_4 + \text{CH}_3\text{F} + \text{NH}_3$ as the simplest sort of gas mixture.

Joshua Lederberg

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